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24. (New) A method according to claim 19 wherein said biopolymer comprises collagen.
25. (New) A method according to claim 19 wherein said binder comprises collagen.

REMARKS

Claims 19, 20, 24 and 25 are presented. Applicants hereby affirm the election of claims 19-20.

Claim 19 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for lacking antecedent basis for "at said site." Claim 19 has now been amended to particularly point out the site at which the method is performed. Withdrawal of the rejection is requested.

Claims 19 and 20 are rejected under 35 U.S.C. Section 102(b) as allegedly being clearly anticipated by Rhee, et al. ("Rhee", U.S. 5,264,214). This rejection is respectfully traversed and reconsideration is requested. The presently claimed invention requires the use of a composition comprising a porous, biodegradable, three-dimensionally stable matrix having shape retention. There are at least two elements of the matrix. First, it comprises a bound network of water-insoluble mineralized biopolymer. Second, it requires a water-insoluble binder.

Rhee discloses a collagen-polymer conjugate. The collagen, preferably reconstituted atelopeptide collagen, is chemically bonded to a synthetic hydrophilic polymer, preferably polyethylene glycol. See column 4, lines 11-16. The collagen-polymer conjugate may optionally be mixed with a suitable particulate material, which is substantially water-insoluble and immiscible with the collagen-polymer. See column 7, lines 37-49. These particulate materials may be hydroxyapatite and/or tricalcium phosphate. Another of the particulate materials may be fibrillar cross-linked collagen. However, both of these are particulate materials and are merely physically mixed with the collagen-polymer conjugate and then air-dried. The collagen-polymer conjugate is not a mineralized biopolymer as required by the present claims. According to the present invention, the collagen is mineralized by precipitating calcium ions and phosphate ions in the presence of the collagen to form a mineralized collagen through a chemical precipitation of the calcium phosphate onto and into the collagen. In Rhee, the collagen-polymer conjugate is merely mixed with a particulate material and then dried. If the particulate material

is hydroxyapatite or tricalcium phosphate, it is introduced into the mixture as such as opposed to being introduced as separate calcium and phosphate ions and precipitated in the presence of the collagen, which mineralizes the collagen.

There also is apparently no water-insoluble binder in Rhee's compositions. According to the present invention, the mineralized collagen is mixed with a binder, preferably a soluble collagen. The mixture is blended, lyophilized and then cross-linked so that the binder, initially a soluble collagen but becoming insoluble subsequent to cross-linking, binds together fibers of the mineralized collagen. By contrast, the collagen-polymer in Rhee is mixed with a particulate, insoluble, collagen immiscible material and then dried. This does not confer a binding function of the particulate material between fibrils of the collagen-polymer conjugate.

Also, the method according to the present invention requires applying to the site of bone repair a porous, biodegradable three-dimensionally stable matrix having shape-retention. When applied in vivo in the body for repair, Rhee's compositions are fluid injectable formulations. See column 11, lines 50-53; column 18, lines 58-61; and column 20, lines 29-31.

The other use disclosed in Rhee for their compositions is as a coating to protect articles which are implanted into the body and intended for relatively long-term residency. See column 12, lines 21-26. The purpose of the coating is to render the object non-immunogenic to reduce the incidence of foreign body reactions. By contrast, the composition used in the present invention is made into a three-dimensional stable matrix and the matrix is implanted at the site of desired bone or cartilage repair.

Therefore, at least for the foregoing reasons, Rhee does not anticipate, nor suggest, the presently claimed method and withdrawal of the rejection is requested.

Claims 19 and 20 are rejected under 35 U.S.C. 102(e) as allegedly being clearly anticipated by Piez et al. ("Piez" U.S. 5,425,770). The Examiner states that Piez discloses a method of bone repair comprising applying a matrix of fibrillar atelopeptide collagen, calcium phosphate mineral, and a dispersion of collagen in water of buffer. The matrix is optionally cross-linked. This rejection is respectfully traversed and reconsideration and withdrawal are requested.

The compositions in Piez are made by mixing the two components, the collagen and calcium phosphate mineral component, as a wet product. See column 5, lines 19-29. The

mixture can be cast into a desired shape and then lyophilized or air-dried. Column 5, lines 29-32. The dry or wet product can also be cross-linked. Column 5, lines 39-44.

An alternative method of combining two components is to form a porous mineral block (of the calcium phosphate material) and then coating the block with collagen from a collagen dispersion, which is infiltrated into the pores of the block. See column 5, lines 52-61.

By neither of these methods is the collagen mineralized as required by the present invention. The collagen is merely mixed with the mineral and dried. Calcium ions and phosphate ions are not precipitated onto and into the collagen fibrils in a mineralization process. Furthermore, there is no binder. The mixture of collagen and calcium phosphate are merely dried as a mass or the collagen dispersion infiltrated into a block of mineral is dried. There is no binder to hold the mineral to the collagen, or the collagen fibrils to one another.

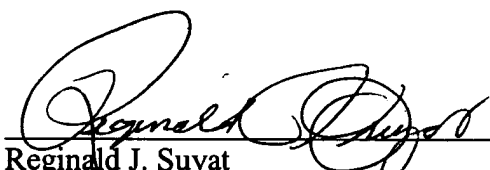
Accordingly, for at least the foregoing reasons, it is submitted that Piez does not disclose nor suggest the invention as presently claimed and withdrawal of the rejection is requested.

Attached is a marked-up version of the changes being made by the current amendment.

Enclosed is a \$55.00 check for the Petition for Extension of Time fee. Please apply any other charges or credits to Deposit Account No. 06-050.

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the claims:

19. (Amended) A method of bone repair comprising the step of applying a composition comprising a porous, biodegradable, three-dimensionally stable matrix having shape retention comprising a bound network of water-insoluble mineralized biopolymer and a water-insoluble binder, effective to promote bone growth at said [a desired] site [of bone repair].
24. (New) A method according to claim 19 wherein said biopolymer comprises collagen.
25. (New) A method according to claim 19 wherein said binder comprises collagen.